

Thermodynamic Properties of the Binary Mixture 1-Butanol + 1-Hexene at High Pressures

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Sustainability means a balanced interaction between economic development, social development and environmental protection. An essential tool to guarantee all these aspects required for a sustainable development of nations is their capability of performing reliable measurements. There are many interesting mixtures, from an industrial point of view, such as oxygenated additives from renewable sources that may be found in next-generation biofuels. This study focuses on the thermodynamic characterization of a new blend of 1-butanol (known as a second generation biofuel) and 1-hexane using volumetric and isobaric heat capacities measurements, to continue the contribution to the international effort towards development and use of environmental sustainable fuels. Densities have been measured by means of an automated Anton Paar DMA HPM vibrating-tube densimeter which has been automated with an estimated uncertainty $\pm 7 \cdot 10^{-4} \text{ g} \cdot \text{cm}^{-3}$ for temperatures below 373.15 K [1]. An automated flow calorimeter has been developed for the accurate measurement of isobaric heat capacities for pure compounds and mixtures over the range $T = (250 \text{ to } 400) \text{ K}$ and $p = (0 \text{ to } 20) \text{ MPa}$. The results have been compared with the available literature values. The estimated total uncertainty of heat capacities is better than $\pm 0.5\%$ [2]. The work reports data of V^E and C_p^E for the mixture 1-butanol + 1-hexene at different temperatures and pressures.

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[2] J.J. Segovia, D. Vega-Maza, C. Chamorro, M.C. Martín, J. Supercrit. Fluids, 46 (2008) 258-264.